Hall Ticket No | | | | | | | | | | | Question Paper Code: AEE002

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech II Semester End Examinations (Supplementary) - July, 2018

Regulation: IARE – R16

ELECTRICAL CIRCUITS

Time: 3 Hours **(Common to ECE | EEE)** **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) State and explain Kirchhoff's laws with relevant circuits. **[7M]**

   (b) A dc circuit comprises of two resistors; resistor A of value 25 ohm and resistor B of unknown value, connected in parallel, together with a third resistor C of value 5 ohm, connected in series with the parallel branch. Find the voltage to be applied across the whole circuit and the value of the resistor B if the potential difference across C is 90V, and the total power consumed is 4320W. **[7M]**

2. (a) Classify different types of Ideal and Practical sources and dependent and independent sources. **[7M]**

   (b) In the circuit shown in Figure 1 , Find I, IL and voltage drop across RL. **[7M]**

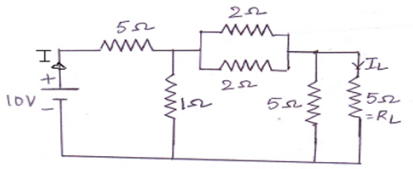

Figure 1

UNIT – II

3. (a) Determine the current in 5Ω resistor for the circuit shown in Figure 2. **[7M]**

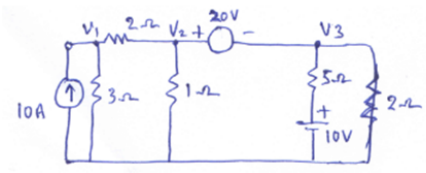

Figure 2

(b) Find current I in the network shown in Figure 3 using star/delta transformation **[7M]**

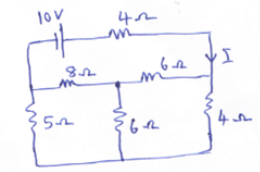

Figure 3

4. (a) Find node voltages in the circuit shown in Figure 4 using nodal analysis. **[7M]**

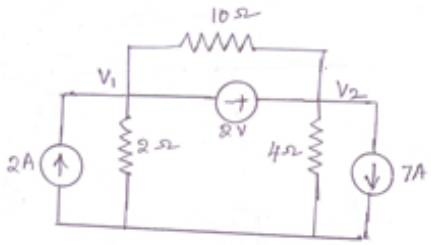

Figure 4

(b) Obtain the dual of the network given in Figure 5 **[7M]**

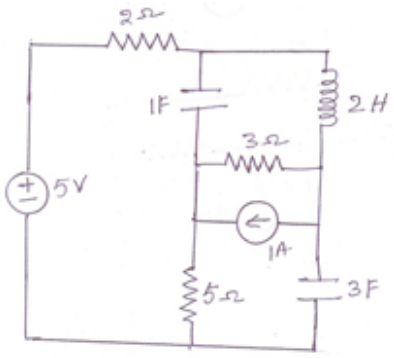

Figure 5

UNIT – III

5. (a) Define active and reactive power. Mention their units. Also explain the importance of power factor in an ac circuit. **[7M]**

(b) The current in a circuit is given by (5+j10)A when the applied voltage is (225+j150)V. Determine(i) the complex expression for the impedance stating whether it is inductive or capacitive ii) power iii) phase angle between current and voltage. **[7M]**

6. (a) Derive the expression for current of a series R-C circuit excited with an AC sinusoidal voltage source. **[7M]**

   (b) Find the RMS value of the periodic waveform given in Figure 6 with time period T. **[7M]**

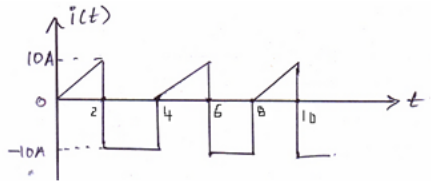

Figure 6

UNIT – IV

7. (a) Explain the concept of Self Inductance and Mutual Inductance. **[7M]**

   (b) Determine the value of Q at resonance and bandwidth for the circuit given in Figure 7 **[7M]**

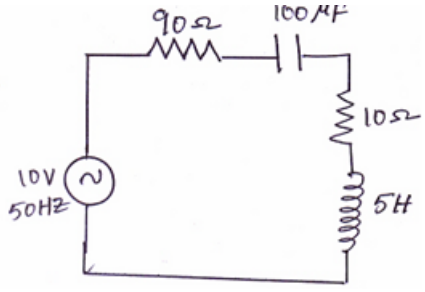

Figure 7

8. (a) Write a short notes on Dot Convention. **[7M]**

   (b) An iron ring of cross-sectional area $6cm^2$ is wound with a wire of 100 turns and has a sawcut (length) of 2mm.Calculate the magnetizing current required to produce a magnetic flux of 0.1mwb if mean length of magnetic path is 30cm and relative permeability of iron is 470. **[7M]**

UNIT – V

9. (a) State and explain Maximum power transfer Theorem for AC and DC excitations. **[7M]**

   (b) Find the Thevenin's Equivalent circuit across the terminals a-b shown in Figure 8 .also find I. **[7M]**

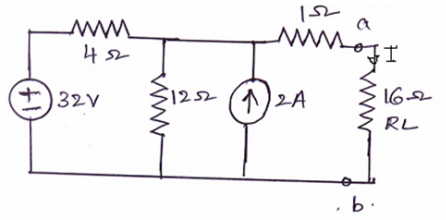

Figure 8

10. (a) State and explain Millman's Theorem. **[7M]**

    (b) Calculate current I in the circuit given in Figure 9 using superposition theorem. **[7M]**

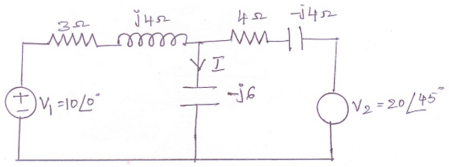

Figure 9

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